

① Given $y = x^2 e^{\frac{1}{x^2}}$, find local extrema

② Find $f(x)$ if $f'(x) = x^{-5} + e^{-x}$
 $f(x) = -\frac{1}{4}x^{-4} - e^{-x} + C$

③ Find the linearization $e^x + \sin x$ at $a = 0$

$$f(a) + f'(a)(x-a)$$

$$\downarrow \qquad \qquad \downarrow$$

$$1 + 2(x-0)$$

$$L(x) = 2x + 1$$

$$f'(x) = e^x + \cos x$$

$$f'(0) = e^0 + \cos(0)$$

$$1 + 1$$

$$y = x^2 e^{\frac{1}{x^2}}$$

$$y' = x^2 \cdot e^{\frac{1}{x^2}} \cdot -2x^{-3} + e^{\frac{1}{x^2}} \cdot 2x$$

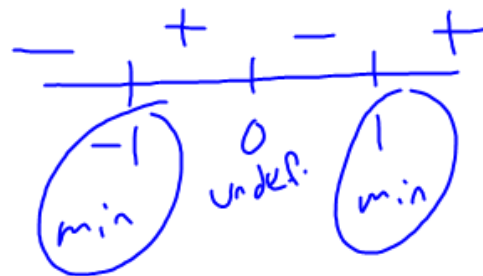
$$y' = \frac{-2e^{\frac{1}{x^2}}}{x} + 2xe^{\frac{1}{x^2}}$$

$$0 = \frac{-2e^{\frac{1}{x^2}}}{x} + 2xe^{\frac{1}{x^2}}$$

$$\cancel{2e^{\frac{1}{x^2}}} = \cancel{2x^2} \cancel{e^{\frac{1}{x^2}}}$$

$$1 = x^2$$

$$x = \pm 1, 0$$



(49) $f(x) = x + \ln(x+1)$

$$f'(x) = 1 + \frac{1}{x+1}$$

$$0 = 1 + \frac{1}{x+1}$$

$$-1 = \frac{1}{x+1}$$

$$-x-1 = 1$$

$$x = -2 \text{ Not in range of } 0 \leq x \leq 3$$

$x=0$ Then $f(x)=0$ one solution

M.V. guarantees

$f'(c)$ would take on every value between $f(b)$, $f(a)$ That the function takes on

4.3

#4, 12, 13, 31, 37

4.5

#4, 6, 21, 23, 28, 29